



UNIVERSITÀ
DEGLI STUDI
DI PADOVA



DIPARTIMENTO
DI INGEGNERIA
DELL'INFORMAZIONE

Master Degree in Computer Engineering

Academic Year 2021/2022

Open Data for *Italian Municipalities* Ontology, Data and Web Apps

MASTER CANDIDATE

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10/10/2022

SUPERVISOR

Prof. Gianmaria Silvello



#1 *Introduction*



#2 *The ontology*



#3 *Data & WebApps*



#4 *Future Works*

Why **Public Administrations** should publish **Linked Open Data**?

Linked Open Data will help transform **eGovernment** by enabling the public administrations to define relationships between data of others.

#1

Publishing Linked Open Data creates new **knowledge** and encourages **creativity** and **innovation**. Governments can activate **smarter** and more efficient **public services** and applications.

#2

Organizations and citizens can develop **new applications** and tools for working with, analyzing, and **making sense** of the **data**.

#3

Introduction

Linked Open Data have a **cost** in terms of **time** and **economic resources**. The **goals** of this thesis are:

Create an **ontology** to describe the data produced by **Italian municipalities**.

Simplify the creation and publication of **Linked Open Data** through a **RDF Graph Builder**.

To make **Data Reports**, a web application for **visualizing** and consulting **data** through **charts, tables** and **maps**.

A photograph of the Colosseum in Rome, Italy, under a blue sky with some clouds. The word "Ontology" is overlaid in a large, pixelated, white font with a black outline.

Ontology

A photograph of a municipality building with a balcony and flags. The word "Data" is overlaid in a large, pixelated, white font with a black outline.

Data

A photograph of a church with a tall bell tower and mountains in the background. The word "WebApps" is overlaid in a large, pixelated, white font with a black outline.

WebApps



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The ontology

The **Ontology for Italian Municipalities (OntoIM)** has been designed and developed:

Extending [OntoPiA](#), a [network of ontologies](#) for the Italian Public Administrations developed by [AgID](#) and other national entities.



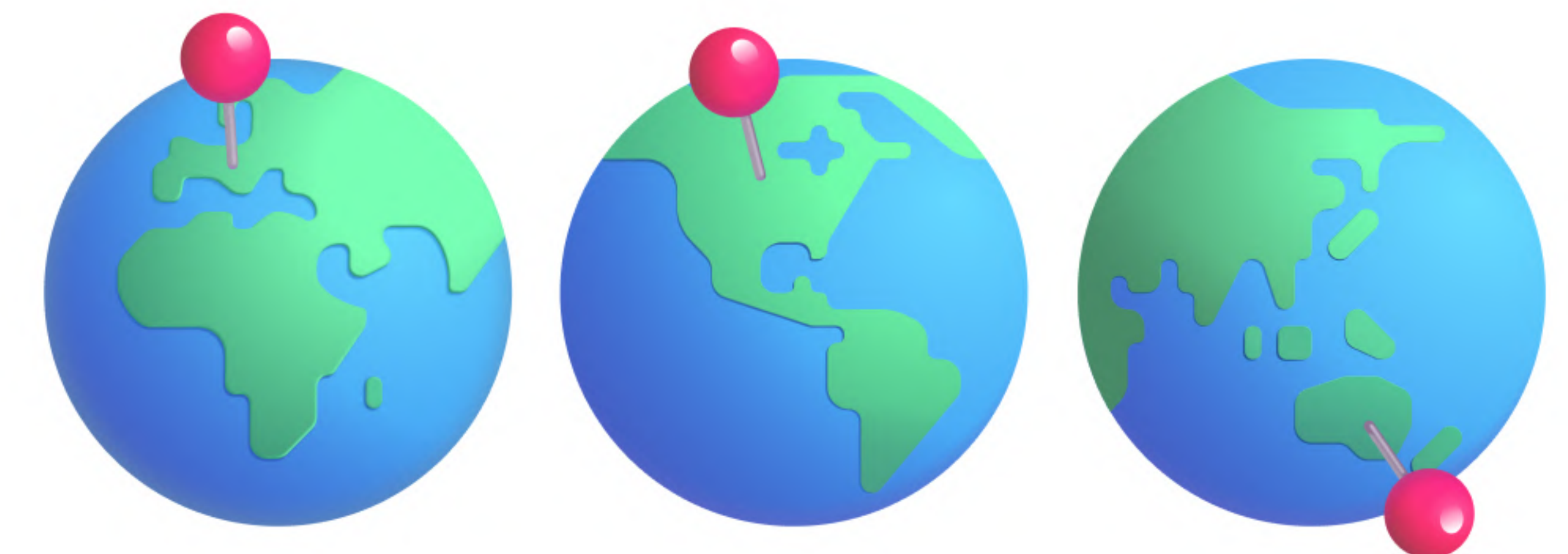
AGID



Comune di Sona

Following the requirements, needs, and data of the [Comune di Sona](#).

Using as reference the [most relevant](#) Italian, European, and global cities's [Open Data](#).



The ontology

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OntoIM describes **nine** specific **domains** about the municipality and the local territory.





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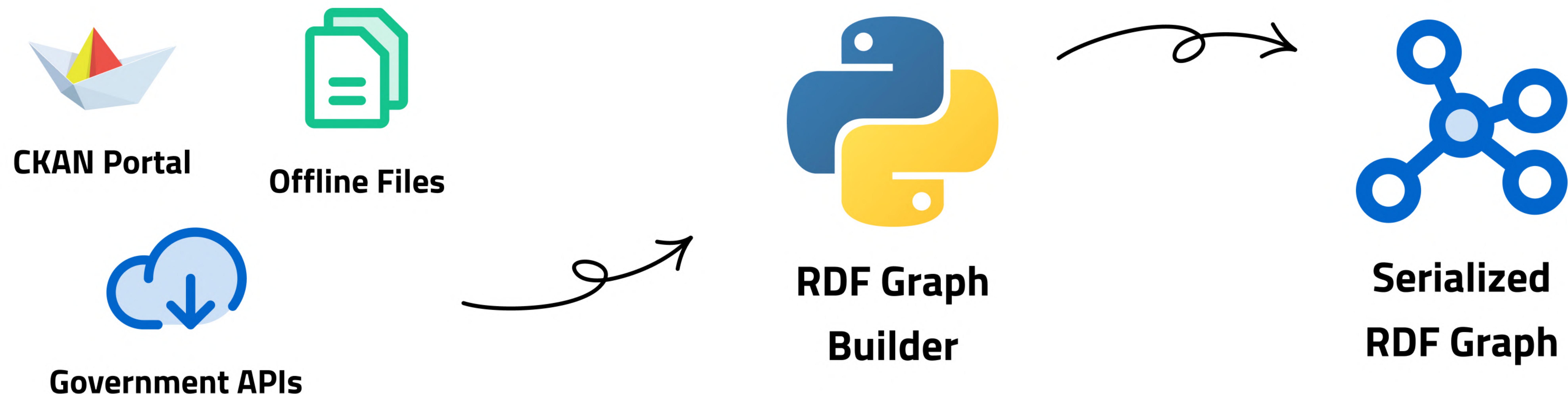
Future Works

Data & WebApps

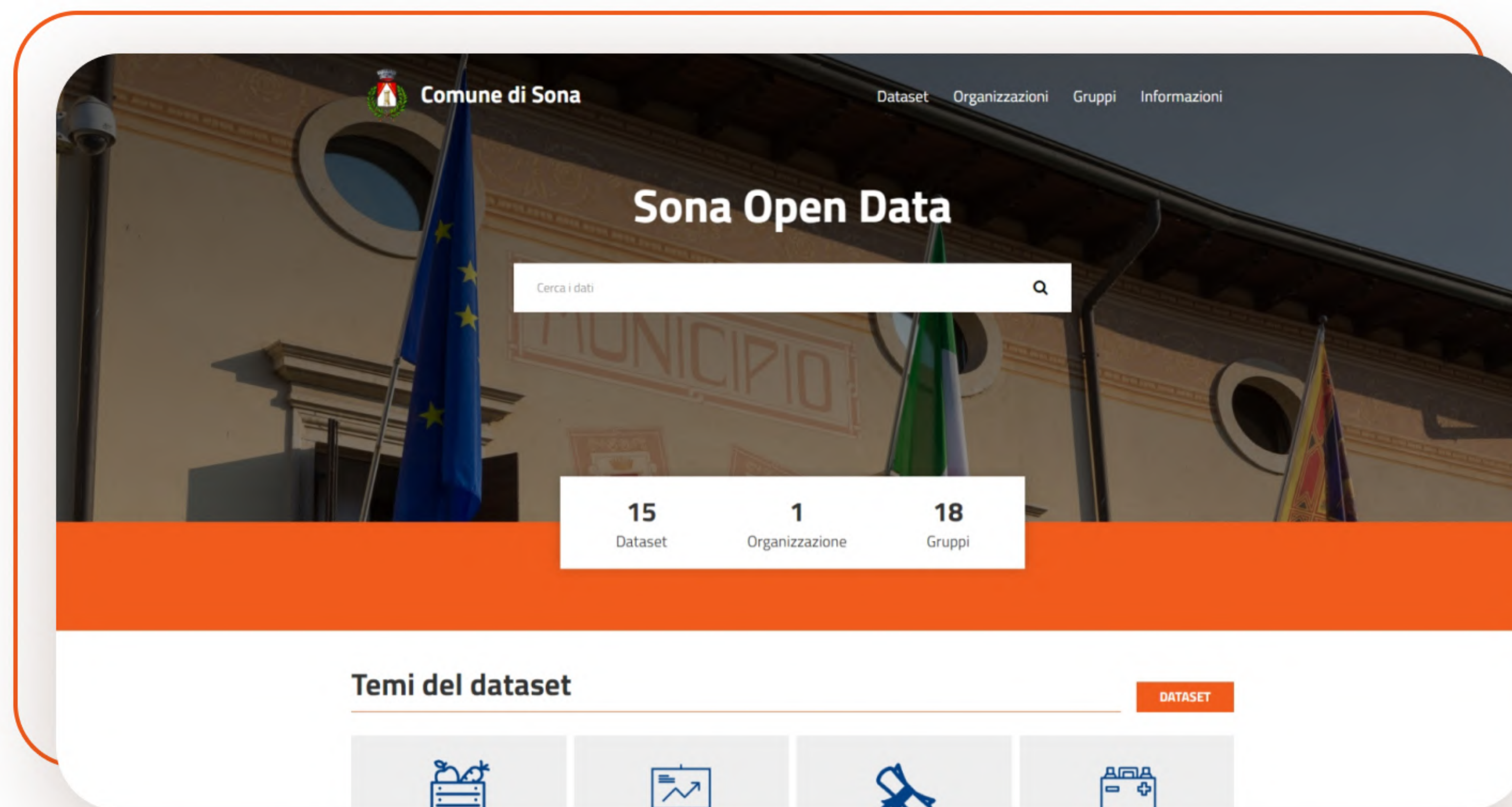
5/8

To [simplify](#) the process of [inserting data](#) as an [RDF Graph](#), two [Python packages](#) were developed: [ontopia-py](#) and [ontoim-py](#), which allow data entry following the [object-oriented programming](#) paradigm.

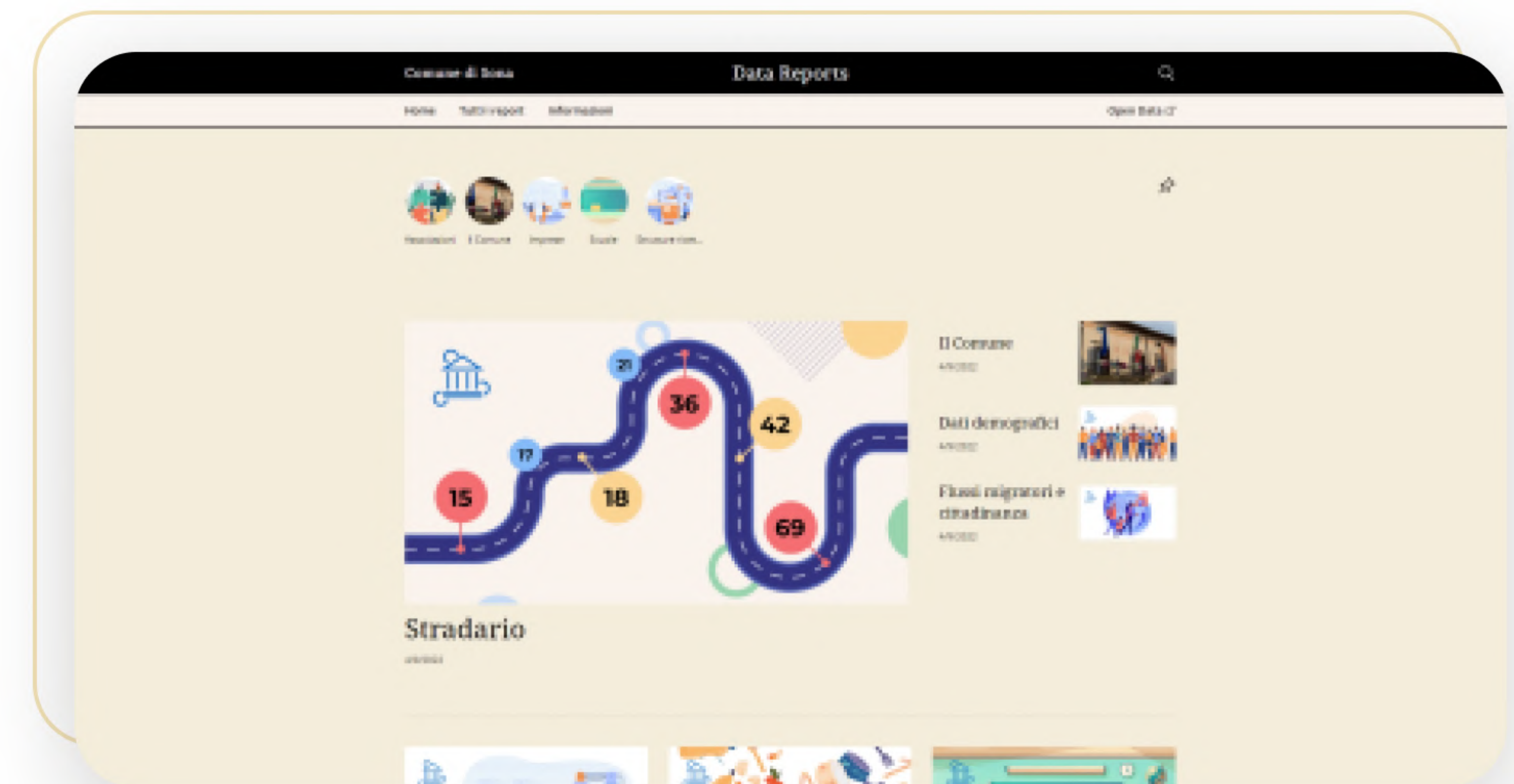
These libraries were used in [RDF Graph Builder](#), an [application](#) that takes data from [different sources](#) and converts them into [Linked Open Data](#).



Two **web applications** were created:



A **CKAN Portal**, which was configured to follow the **AgID requirements** for Open Data.



Data Reports, a WebApp built in **Svelte** to visualize data through **charts**, **tables**, and **maps**.



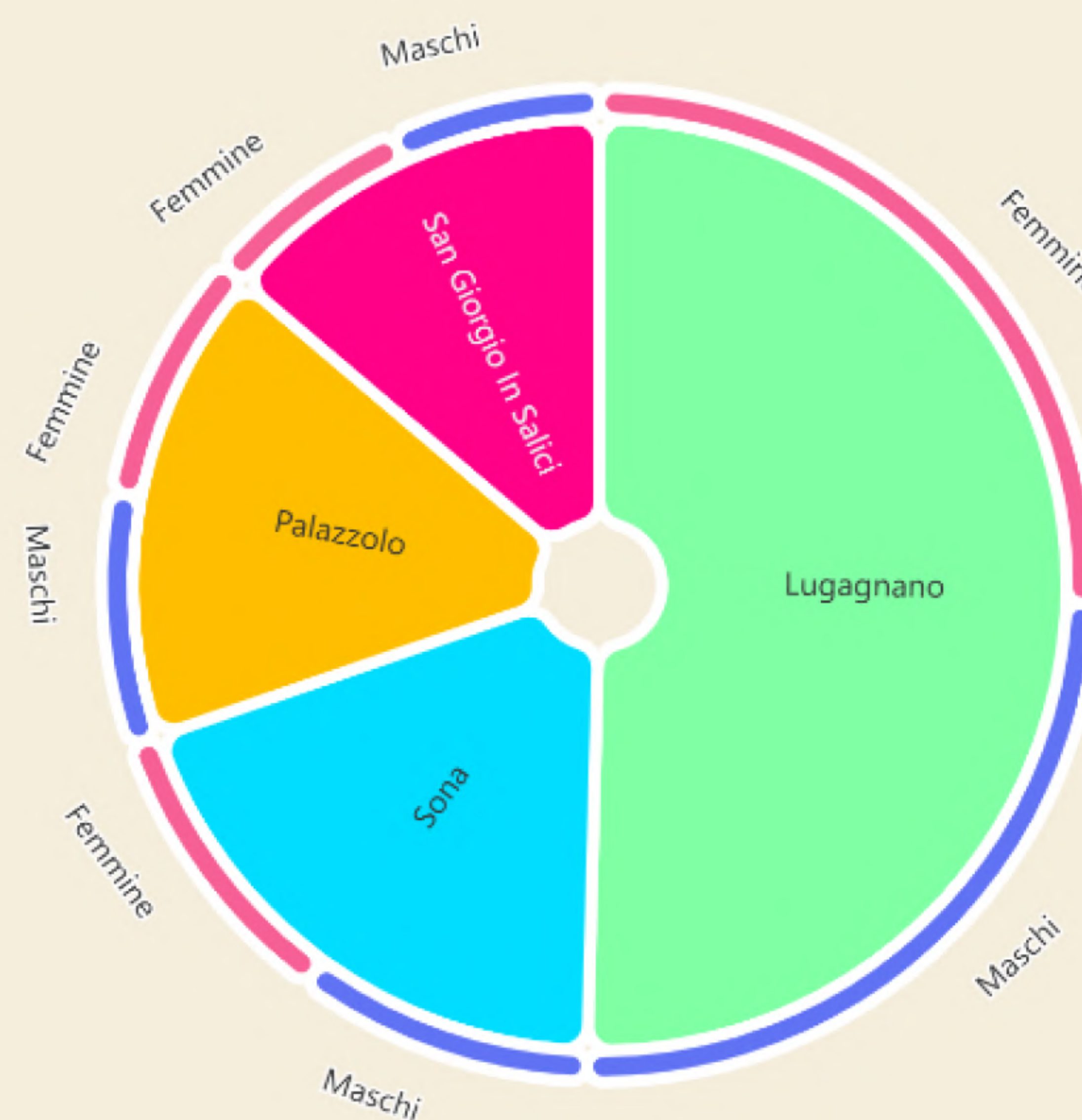
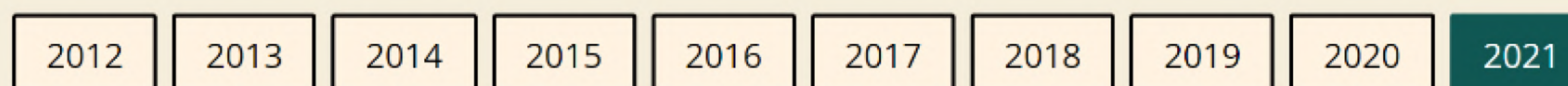
4/9/2022

Dati demografici

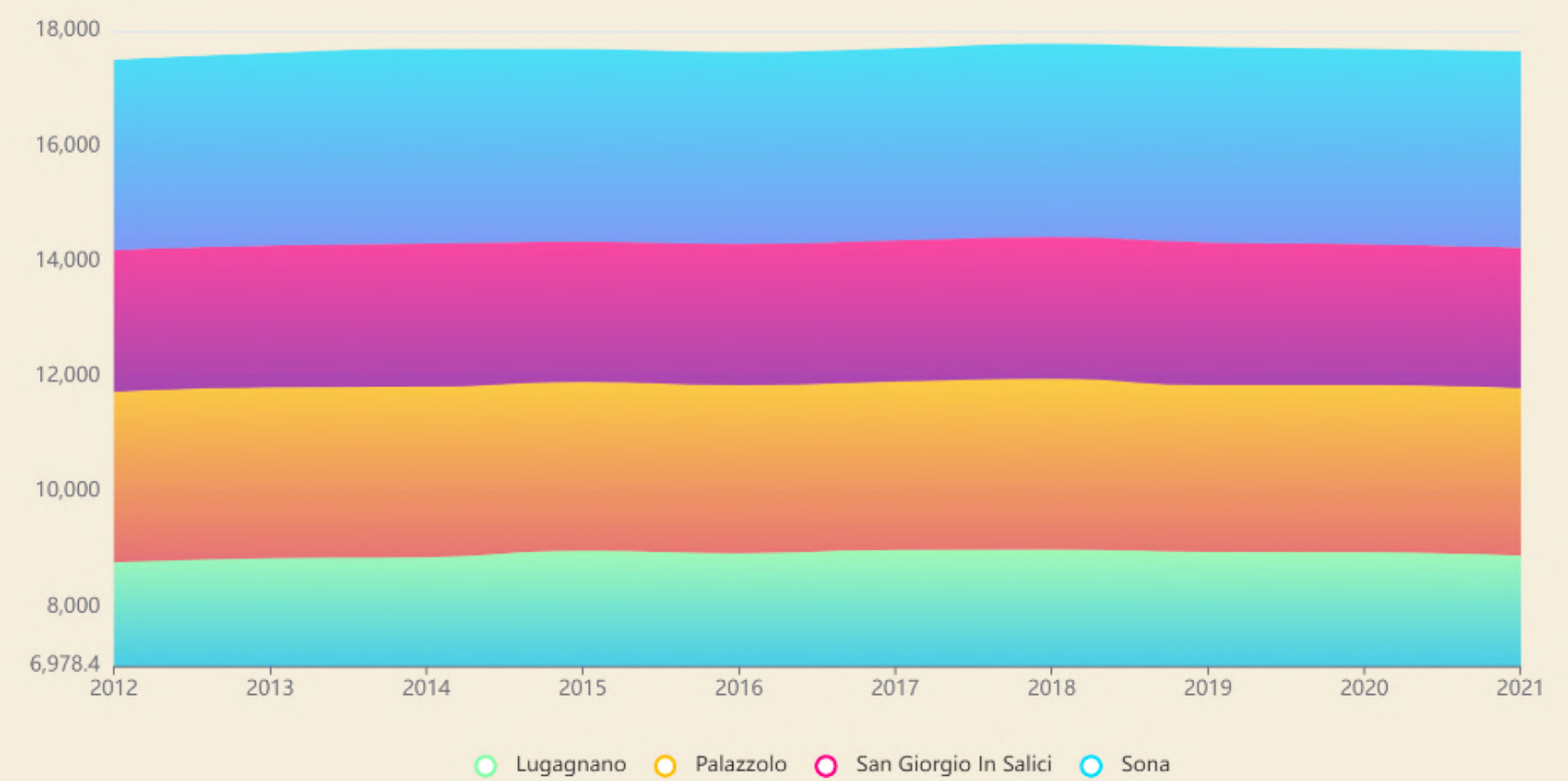
Anagrafe

Distribuzione della popolazione

Distribuzione della popolazione per frazione



Andamento demografico per frazione degli ultimi anni



Nomi e cognomi più diffusi

Nomi più diffusi

Maschi

Femmine

Totale

NOME	TOTALE
Andrea	287
Marco	252
Luca	203
Alessandro	193

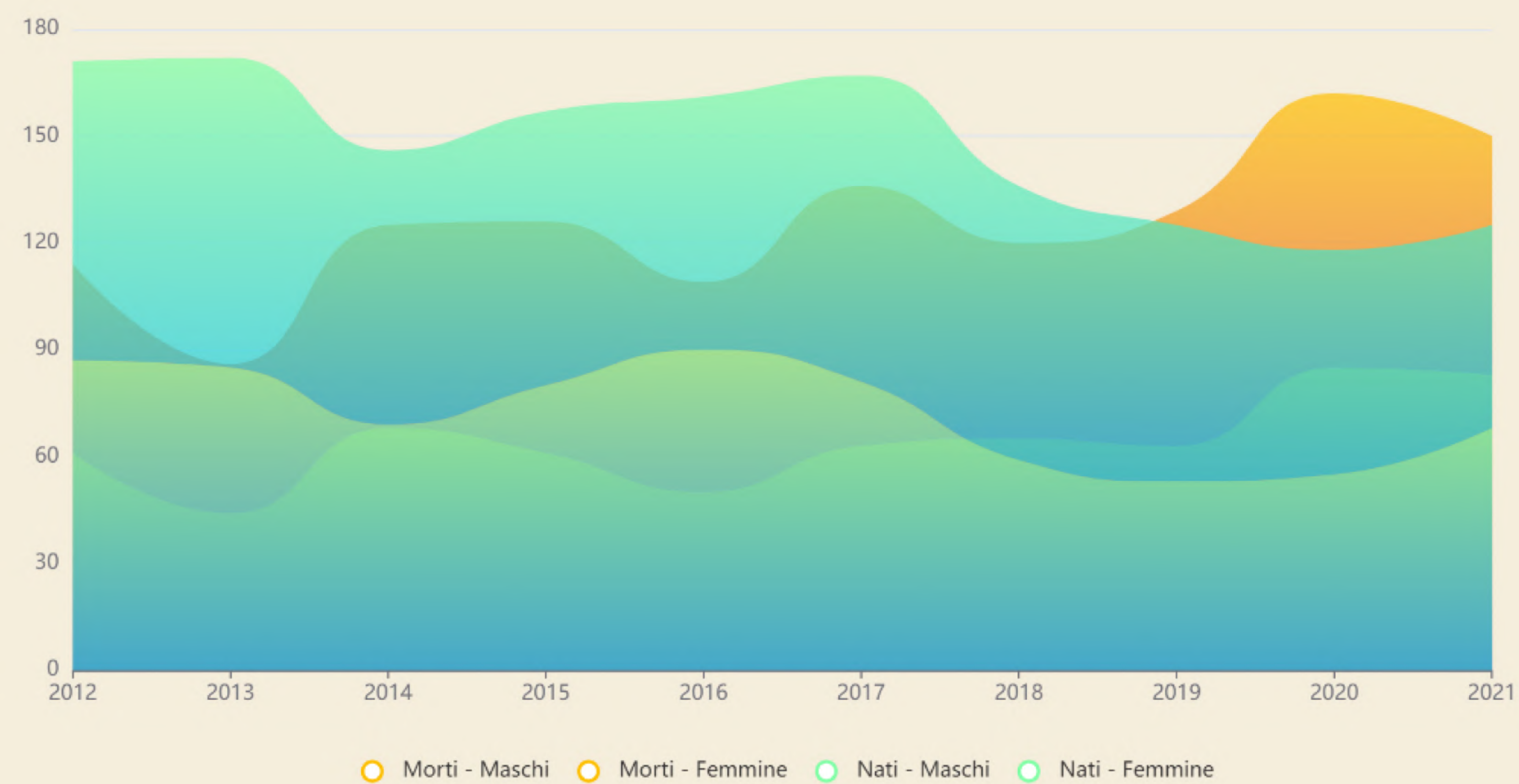


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Stato Civile (nati, morti, matrimoni)

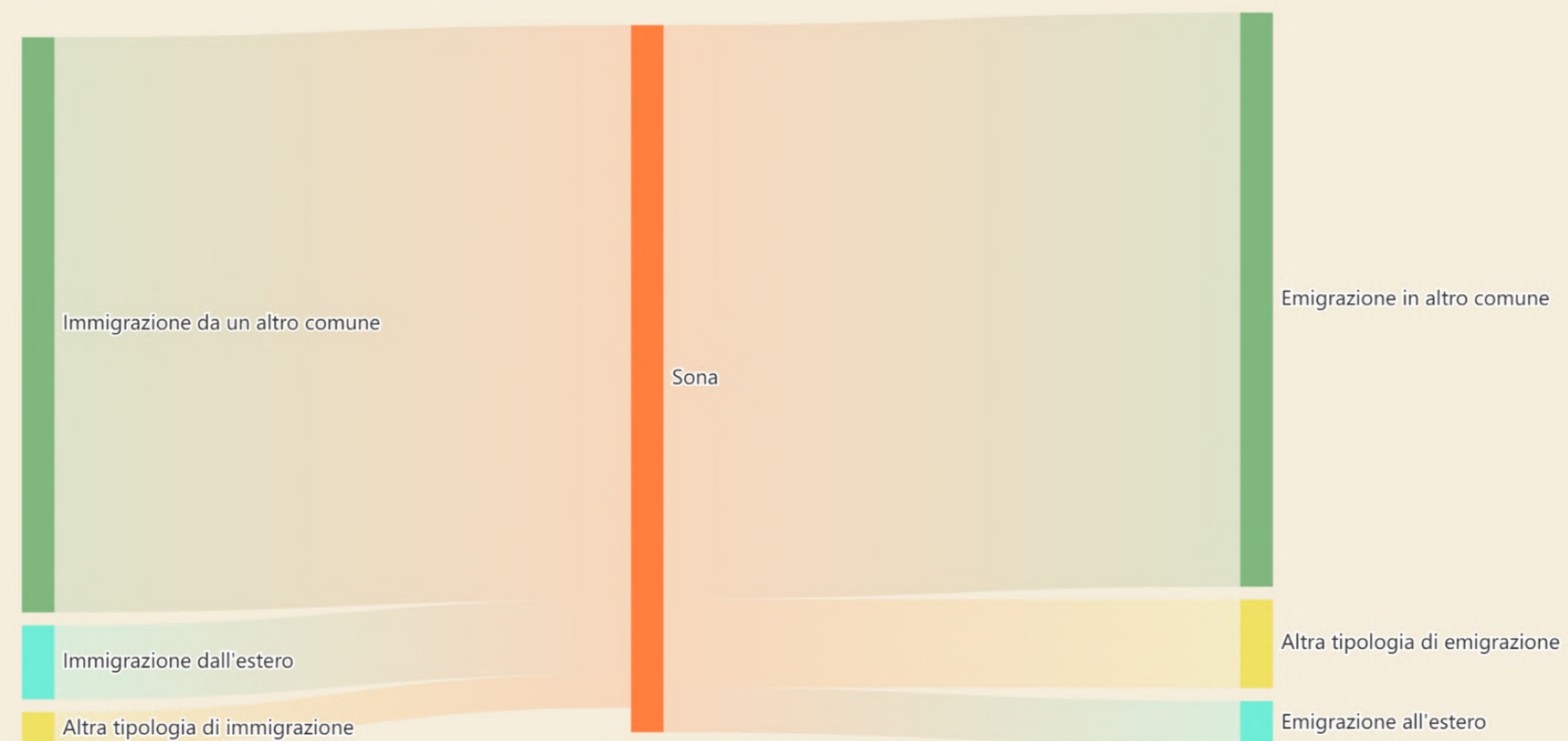
Stato Civile

Nati e morti



Flussi migratori

2012 2013 2014 2015 2016 2017 2018 2019 2020 2021



Cittadini stranieri

2012 2013 2014 2015 2019 2020 2021



Cittadini stranieri

2012

2013

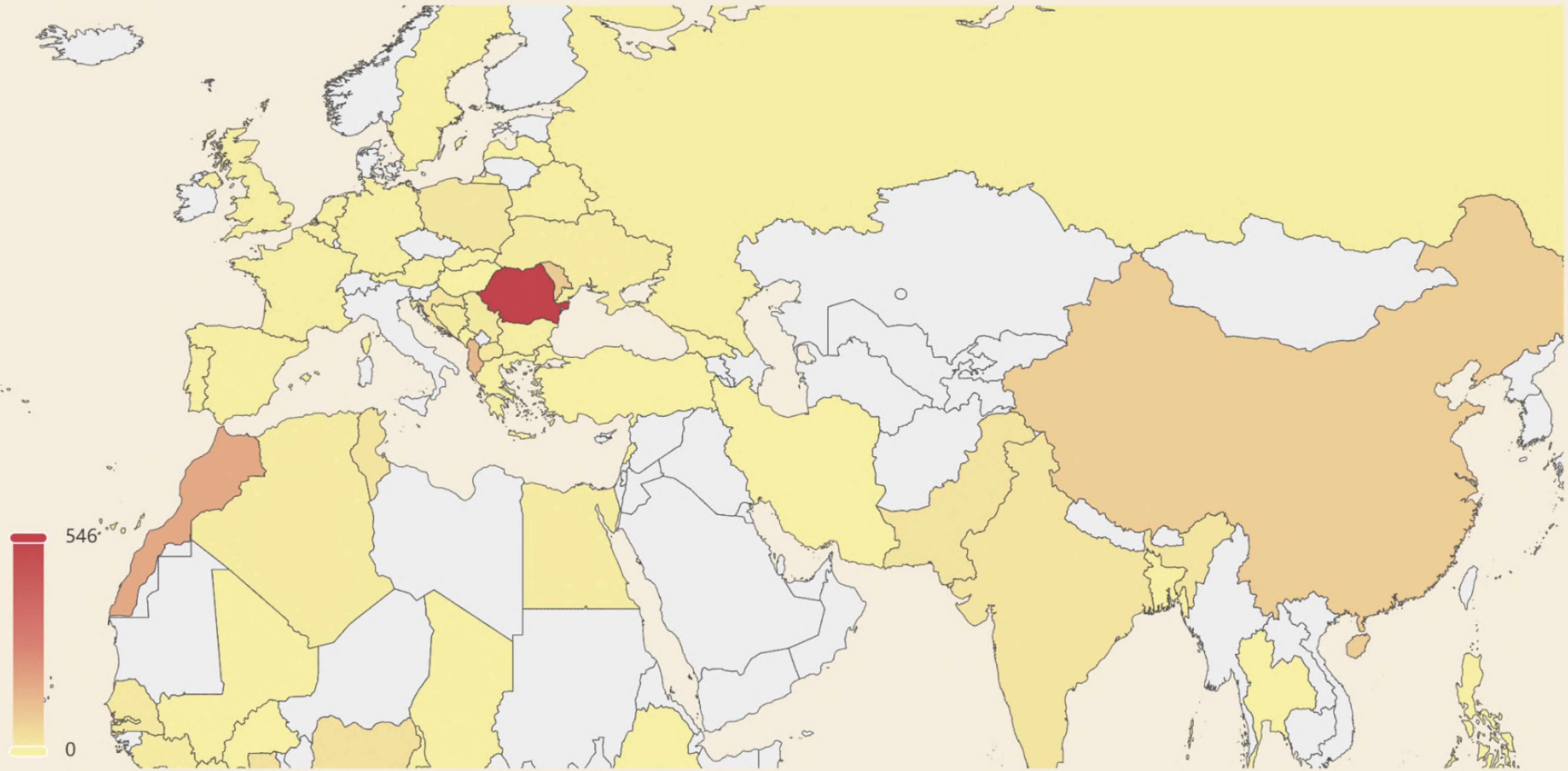
2014

2015

2019

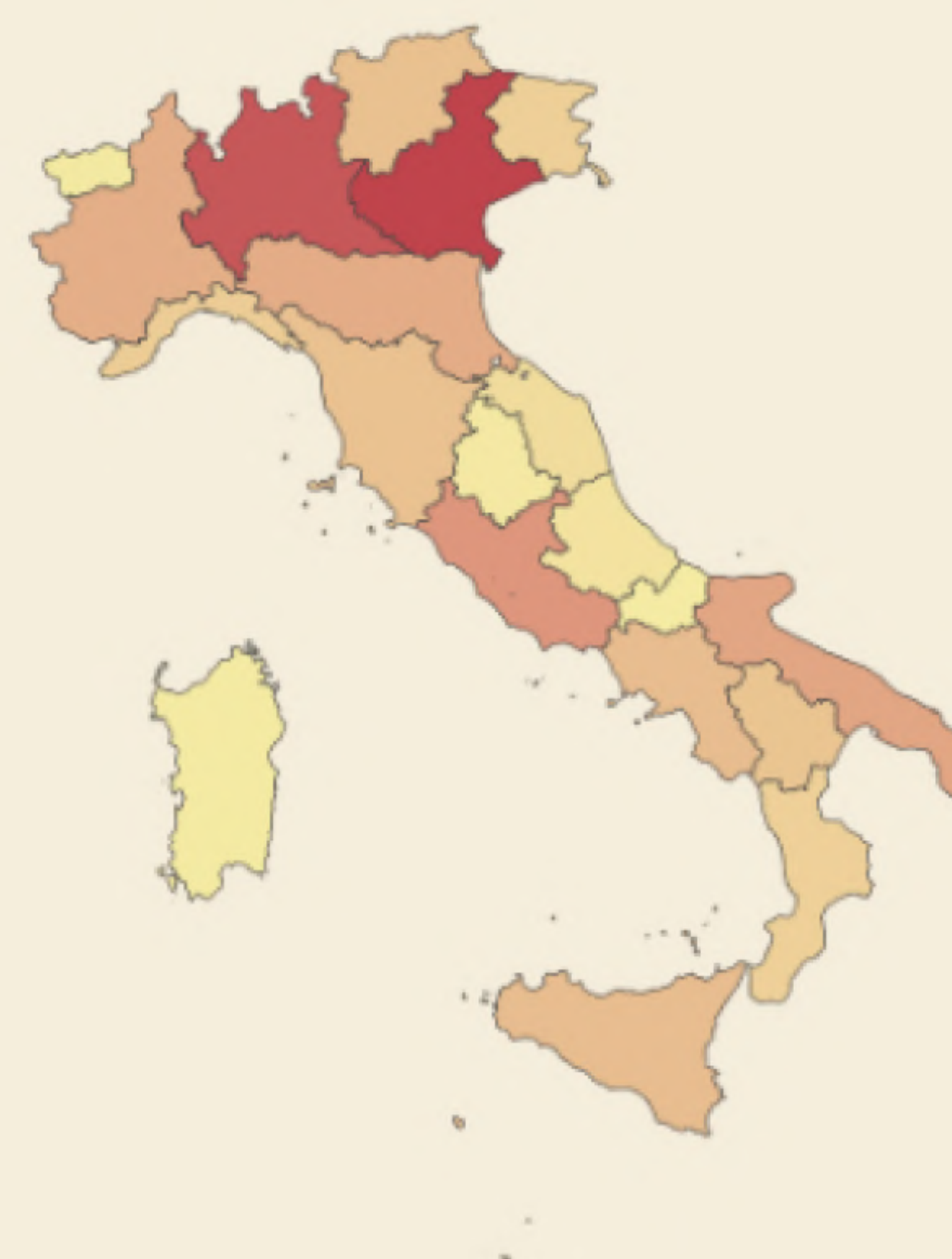
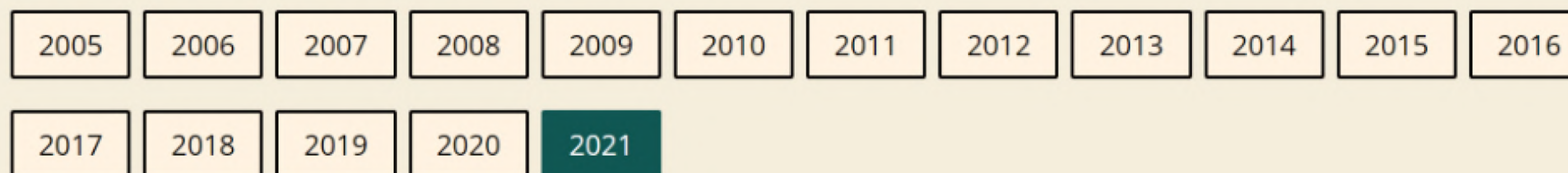
2020

2021





Mappa completa per la provenienza dei turisti italiani



Comune di Sona

CF/P.IVA 00500760236

Piazza Roma, 1, 37060 - Sona (VR)

LodView

Open Data Portal

SPARQL Endpoint

Realizzato da Luca Martinelli

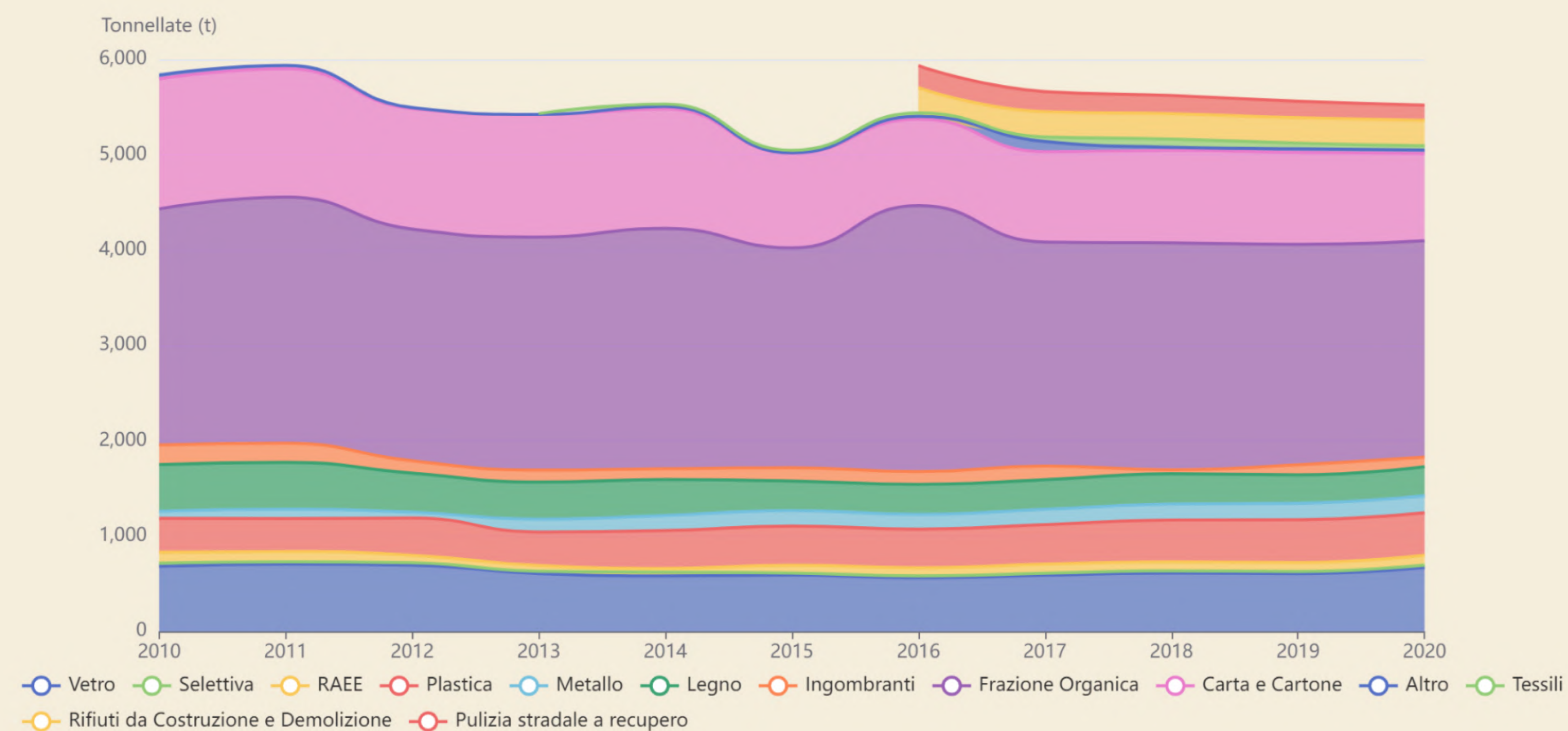


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Produzione di rifiuti

Ambiente

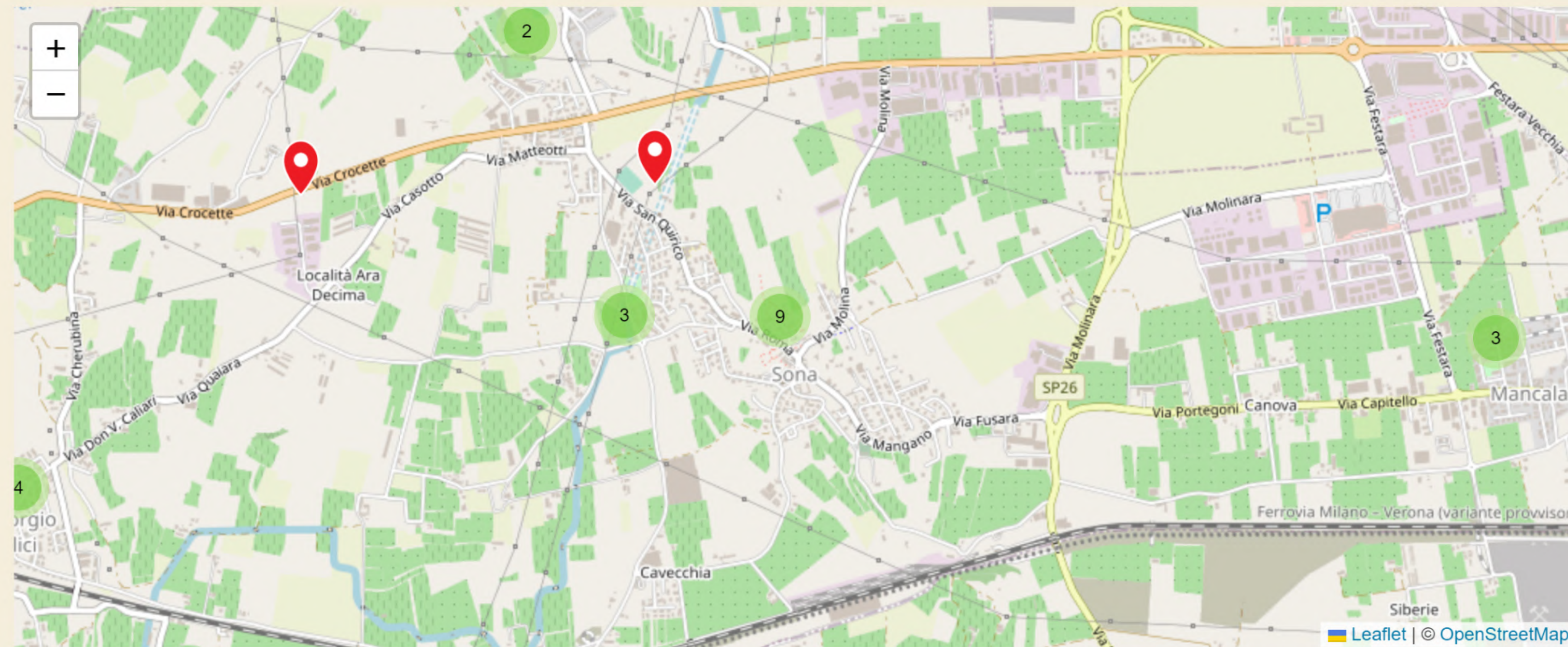
Produzione di rifiuti negli anni



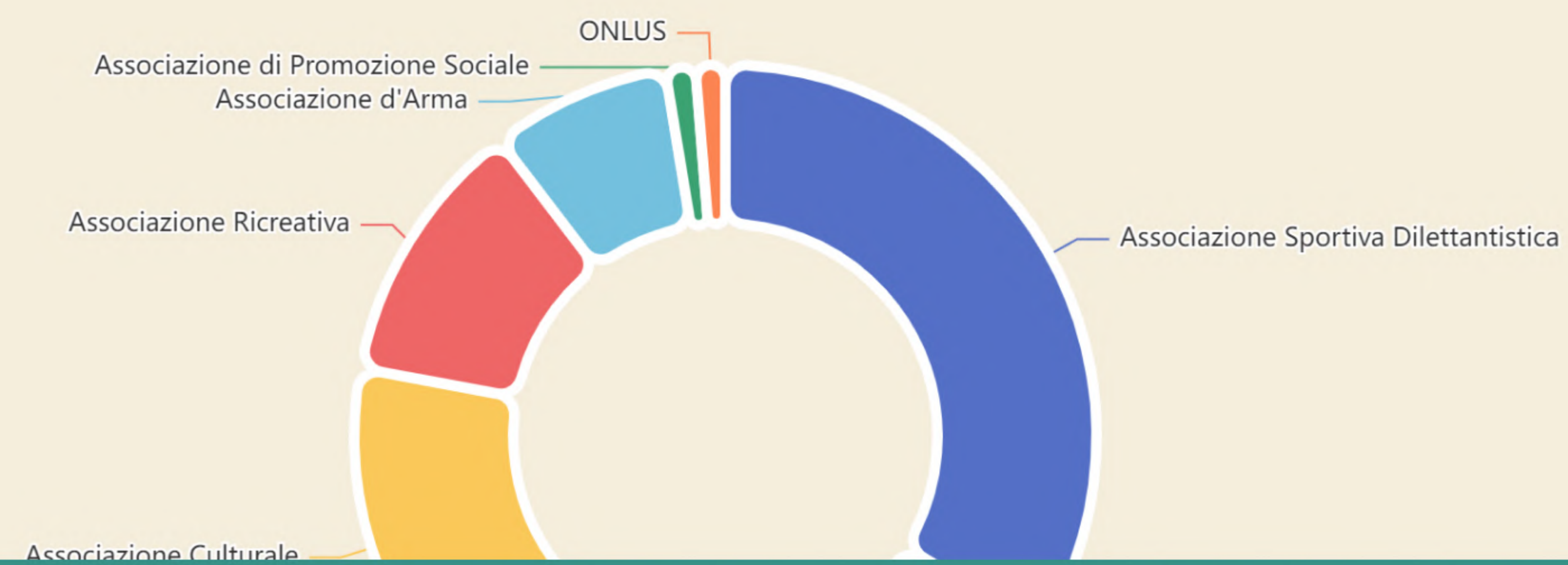
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Associazioni

Associazioni



Tipologia di associazioni





#1 *Introduction*



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#4 *Future Works*

Future Works

This thesis project will be **improved** in the following ways **in the future**:

Extending and improving the ontology to describe more domains. Separating it into individual ontologies divided by semantic area so that it can become part of the Italian OntoPiA profile.

Improving the RDF Graph Builder and developing an easy-to-setup mapper to convert data from different sources into Linked Open Data.

A photograph of the Colosseum in Rome at night, illuminated by warm lights. The word "Ontology" is overlaid in a large, white, pixelated font.

Ontology

A photograph of a municipal building facade with several flags (European Union, Italian, and others) and flower boxes. The word "Data" is overlaid in a large, white, pixelated font.

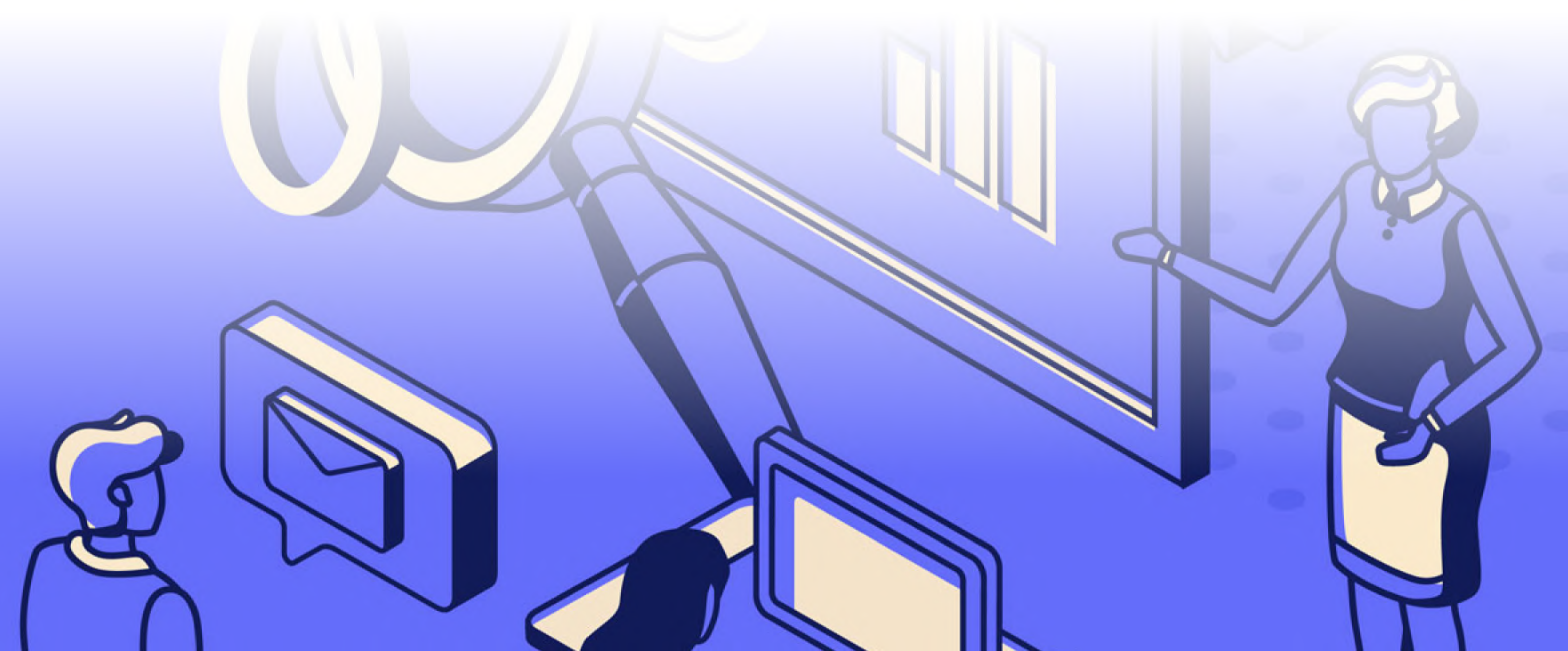
Data

Future Works

The project will be a **key part** of **Digital Hub**, a project involving **11 municipalities** in the province of **Verona**.

This project is part of the **Innovation Lab** project, funded by the **Regione Veneto**, to promote **digital culture** and the use of **Open Data**.

Digital Hub
Persone in rete



*Thanks for your
attention*